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OGILVY RENAULT (PWC)
1981 MCGILL COLLEGE AVENUE
SUITE 1600
MONTREAL, QC H3A 2Y3
CANADA

EXAMINER	
VERDIER, CHRISTOPHER M	
ART UNIT	PAPER NUMBER
3745	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/627,970	DJERIDANE ET AL.	
	Examiner	Art Unit	
	Christopher Verdier	3745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-10* is/are allowed.

6)☒ Claim(s) *11,13,15-17,26,28 and 30* is/are rejected.

7)☒ Claim(s) *12,14,18-25,27,29 and 31-35* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11-17-03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Specification

The abstract of the disclosure is objected to because it contains the legal term "said" (line 4) which should be deleted. Correction is required. See MPEP § 608.01(b).

The incorporation of essential material in the specification (see paragraph 28, lines 15-17) by reference to a foreign application or patent (European Patent 1,251,243) is improper. Applicant is required to amend the disclosure to include the material incorporated by reference. The amendment must be accompanied by a statement executed by the applicant, or a practitioner representing the applicant, stating that the material being inserted is the material previously incorporated by reference and that the amendment contains no new matter. Alternately, Applicant can refer to US Patent Application Publication 2004/0115054, which is the equivalent to the European Patent. See 37 CFR 1.57(f).

The disclosure is objected to because of the following informality: Appropriate correction is required.

In paragraph 6, line 3, "passages" should be changed to -- passage --.

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Claim 8, which recites that the cooling air flow is caused to swirl in at least a pair of counter-rotating vortices, has no antecedent basis in the specification.

Claim 20, which recites that at least a portion of the deflector extends from the first side at an acute angle, has no antecedent basis in the specification.

Claim 26, line 6, which recites substantially preserving a swirling nature of the coolant flow, has no antecedent basis in the specification.

Claim 28, lines 1-2, which recite that the deflector does not directly split a primary swirl flow, has no antecedent basis in the specification.

Claim 30, which recites at least three cooling inlets, has no antecedent basis in the specification.

Claim 32, which recites generally preserving the vortical nature of the cooling flow, has no antecedent basis in the specification.

Claim Objections

The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims 30-36 have been renumbered as claims 29-35, respectively.

Claims 18-25 are objected to because of the following informality: Appropriate correction is required.

In claim 18, line 5, "the" (first occurrence) should be deleted.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 13, lines 1-2 recite "said one side". It is unclear if this refers to the peripheral side, or the opposing peripheral side.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 11 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Hall 4,820,122 (figure 2). Note the unnumbered internally cooled turbine blade having a root portion (unnumbered, near reference numeral 46, and corresponding to the root 18 in figure 1) adapted to be received in a blade attachment slot defined in a rotor disc, the turbine blade comprising a plurality of unnumbered internal cooling flowpaths (serpentine and linear) each having at least one inlet near 26a, 28a, 30a defined in a surface of the root portion, the plurality of inlets arranged in the surface generally in a linear array relative to one another, the linear array defining a linear axis, and at least one deflector 40 extending from a peripheral side (the front side) of the root surface and partially across the surface towards an opposing peripheral side (the rear side) of the surface, the deflector having a principal face adapted to in use contact and redirect a cooling flow entering the slot, wherein the face is disposed at an acute angle relative to the linear axis. A second deflector 42, 44 is provided. The root portion is considered to be capable of performing the intended use recitation of being "adapted to be received in a blade attachment slot defined in a rotor disc", because one of ordinary skill in the art would recognize that the unnumbered portion of the turbine blade is the root portion, and the root portion is shaped such that it is capable of being received in a blade attachment slot defined in a rotor disc. Note that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 370 F.2d 576, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 312 F.2d 937, 939, 136 USPQ 458, 459

(CCPA 1963). Note also that a recitation directed to the manner in which a claimed apparatus is intended to be used does not distinguish the claimed apparatus from the prior art, if the prior art has the capability to so perform. MPEP 2114 and *Ex parte Masham*, 2 USPQ2d 1647 (1987).

Claims 11 and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Balland 2004/0115054 (figures 2A, 2B, 4, and 9). Note the internally cooled turbine blade 11 having a root portion 13 adapted to be received in a blade attachment slot 14 defined in a rotor disc 12, the turbine blade comprising a plurality of internal cooling flowpaths 15 each having at least one unnumbered inlet defined in a surface of the root portion, the plurality of inlets arranged in the surface generally in a linear array relative to one another, the linear array defining a linear axis, and at least one deflector 82 extending from a peripheral side of the root surface and partially across the surface towards an opposing peripheral side of the surface, the deflector having a principal face 82 adapted to in use contact and redirect a cooling flow entering the slot, wherein the face is disposed at an acute angle relative to the linear axis. A second deflector 81 is provided.

Claims 11, 15 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by United Kingdom Patent 2,225,063. Note the internally cooled turbine blade 22 having a root portion 11 adapted to be received in an unnumbered blade attachment slot (see figure 3) defined in a rotor disc 7, the turbine blade comprising a plurality of internal cooling flowpaths 12, 20, 21 each having at least one unnumbered inlet defined in a surface of the root portion, the plurality of inlets arranged in the surface generally in a linear array relative to one another, the linear array

defining a linear axis, and at least one deflector (the angled portion 9) extending from a peripheral side of the root surface (the rear side in figure 1) and partially across the surface towards an opposing peripheral side of the surface (the front side in figure 1), the deflector having an unnumbered principal face adapted to in use contact and redirect a cooling flow entering the slot, wherein the face is disposed at an acute angle relative to the linear axis. The deflector is located adjacent an inlet 12 having an intermediate position in the linear array. The deflector is adapted to redirect a flow of cooling air in the slot towards the intermediate inlet.

Claims 26, 28, and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by United Kingdom Patent 2,225,063. Note the method of supplying a coolant flow to an internally cooled turbine blade 22, the blade having a root portion 11 defining a plurality of coolant inlets near 12, 20, 21, the root portion being received in an unnumbered blade attachment slot defined in a rotor disc 7 of a gas turbine engine, the method comprising the steps of directing a swirl of coolant into the blade attachment slot (the coolant is swirled due to the relative movement between the rotation of the rotor disc and the supplied cooling air, entering at an angle to a sidewall of the coolant slot) and deflecting the coolant inside the blade attachment slot via deflector 9 while substantially preserving a swirling nature of the coolant flow (due to the fact that the swirl flow is free to flow along the top of the deflector in a circumferential direction) to thereby prevent a low pressure region from forming in a position corresponding to a center coolant inlet. The deflector does not directly split a primary swirl flow entering the slot. Also disclosed is a method of regulating the division of a flow of cooling air supplied to at least three cooling inlets near 12, 20, 21 leading to cooling passages 12, 20, 21 defined inside a rotating airfoil 2 in a gas

turbine engine, the rotating airfoil being mounted to the rotary disc and cooperating therewith to form an unnumbered air cavity therebetween, the air cavity having an unnumbered entrance for admitting cooling air thereto, a downstream end at an end of the cavity opposite the entrance, and an unnumbered sidewall extending radially along a disc radial axis and axially between the entrance and the downstream end, the at least three inlets communicating with the air cavity and arranged in an array extending along the air cavity from a first of the inlets to a last of the inlets, the last inlet being closest to the cavity downstream end, the method comprising the steps of: rotating the rotor disc with the airfoil mounted thereto, directing cooling air into the air cavity through the entrance and substantially along the sidewall towards the downstream end (note that due to rotation of the rotor disc, the air will flow along the sidewall towards the downstream end), and, at a position intermediate the entry and downstream end (near 12), directing cooling air away from the sidewall towards at least one inlet 12 intermediate the first and last inlets.

Claim 30 is rejected under 35 U.S.C. 102(e) as being anticipated by Balland 2004/0115054 (figures 2A, 2B, 4, and 6). Note the method of regulating the division of a flow of cooling air supplied to at least three cooling inlets near 15 leading to cooling passages 15 defined inside a rotating airfoil 11 in a gas turbine engine, the rotating airfoil being mounted to a rotary disc 12 and cooperating therewith to form an air cavity 14 therebetween, the air cavity having an unnumbered entrance for admitting cooling air thereto, a downstream end at an end of the cavity opposite the entrance, and an unnumbered sidewall extending radially along a disc radial axis and axially between the entrance and the downstream end, the at least three inlets communicating with the air cavity and arranged in an array extending along the air cavity from a

first of the inlets to a last of the inlets, the last inlet being closest to the cavity downstream end, the method comprising the steps of: rotating the rotor disc with the airfoil mounted thereto, directing cooling air into the air cavity through the entrance and substantially along the sidewall towards the downstream end (note that due to rotation of the rotor disc, the air will flow along the sidewall towards the downstream end), and, at a position intermediate the entry and downstream end (at the rightmost end of deflector 22 in figure 2B, or the rightmost end of deflector 52 in figure 6), directing cooling air away from the sidewall towards at least one inlet (the cooling passage 15 corresponding to 21 in figure 2B and the cooling passage 15 corresponding to 55 in figure 6) intermediate the first and last inlets.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 11 and 16 are also rejected under 35 U.S.C. 103(a) as being unpatentable over Hall 4,820,122 in view of Fahndrich 5,984,636. Hall (figure 2) discloses an unnumbered internally cooled turbine blade substantially as claimed, having a root portion (unnumbered, near reference numeral 46, and corresponding to the root 18 in figure 1), the turbine blade comprising a plurality of unnumbered internal cooling flowpaths (serpentine and linear) each having at least one inlet near 26a, 28a, 30a defined in a surface of the root portion, the plurality of inlets arranged in the surface generally in a linear array relative to one another, the linear array defining a linear axis, and at least one deflector 40 extending from a peripheral side (the front side) of the root surface and partially across the surface towards an opposing peripheral side (the rear side) of the surface, the deflector having a principal face adapted to in use contact and redirect a cooling flow entering the slot, wherein the face is disposed at an acute angle relative to the linear axis. A second deflector 42, 44 is provided.

However, Hall does not explicitly disclose that the root portion is adapted to be received in a blade attachment slot defined in a rotor disc.

Fahndrich (figures 1 and 3) shows a turbine blade 11 having a root portion 15 that is received in a blade attachment slot 17 in a rotor disc 3, for the purpose of securing the turbine blade to the rotor disc.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the turbine of Hall such that the turbine blade root portion is adapted to be received in a blade attachment slot defined in a rotor disc, as taught by Fahndrich, for the purpose of securing the turbine blade to the rotor disc.

Allowable Subject Matter

Claims 1-10 are allowed.

Claims 18-25 contain allowable subject matter; Applicants should correct the informality therein.

Claims 12, 14, 27, 29, and 31-35 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 13 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (571) 272-4824. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C.V.
February 14, 2005

Christopher Verdier
Primary Examiner
Art Unit 3745